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Study of Self-Diffusion of n-Decane in NaX Zeolite by the Pulsed Magnetic-Field Gradient NMR Method

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Abstract

Translational mobility of n-decane molecules in a porous space of NaX zeolite was studied within the wide ranges of diffusion times and temperatures. The dependence of the effective self-diffusion coefficient on diffusion time was established. Confined mobility of diffusant molecules inside the crystallite was observed both for complete and partial filling of NaX pores with a liquid, when the adsorption barrier was absent at the interface between intra- and intercrystallite regions. It was suggested that obstacles are present at the surface of NaX crystallites complicating the transfer of liquid molecules from crystallite channels to intercrystallite space. True value of self-diffusion coefficient of n-decane in the itracrystallite space of NaX was determined and its dependence on the concentration of liquid molecules in zeolite channels was considered. A special attention was paid to the study of molecular exchange between intra- and intercrystallite-confined liquids.

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